

RESEARCH MATTERS

Interim News from the Senate Research Center

August 2001



THE TROUBLE WITH FIRE ANTS

Fire ants, including non-native or what experts call “imported” fire ants, are notorious for their painful stings and aggressive behavior. They defend their mounds ferociously, sometimes attacking by the hundreds. First gripping with their jaws, the ants sting repeatedly, causing an immediate burning sensation that feels like fire. The real discomfort of a sting fades within an hour for most people, but highly sensitive individuals may experience more serious symptoms such as swelling, nausea, or shortness of breath. Deaths, however, from imported fire ant stings are very infrequent compared to the number associated with bee and wasp stings.

BACKGROUND



Imported fire ants are only one of thousands of non-native species of plants and animals that have become invasive in the United States, jeopardizing the environment and human health, and costing the country around \$138 billion each year. Although there are several species of native fire ants in the United States, it is two non-native species accidentally brought to this country around 1920 that are of paramount concern. Both the red imported fire ant (*Solenopsis invicta*) and the black imported fire ant (*Solenopsis richteri*) were probably introduced through ballast or dunnage on freight ships arriving in Mobile, Alabama from South America. Imported fire ants are not pests in their own countries where natural biological enemies, such as native parasites and pathogens, control them. Yet with no similar restraints here in the United States, imported fire ants have spread profusely and are now a significant problem in over a dozen states. They are concentrated in southeastern states because their migration northward is hampered by cold weather extremes, and their westward expansion is slowed by dry desert climates. Imported fire ants are currently found in Alabama, Arkansas, California, Florida, Georgia, Louisiana, Mississippi, New Mexico, North Carolina, Oklahoma, Puerto Rico, South Carolina, Tennessee, and Texas.

DAMAGE CAUSED BY IMPORTED FIRE ANTS

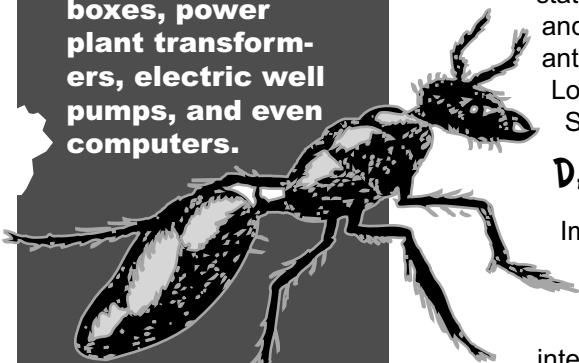
Imported fire ants are surprisingly destructive. In terms of agriculture, they can destroy crops, damage irrigation systems, ravage seeded fields, and even kill young livestock and wildlife. They pose a health threat to agricultural workers, and their mounds, sometimes a foot and a half high, can interfere with harvesting. They are a serious threat to children and persons whose movement may be impaired, especially if the ants forage or nest indoors. Drawn to electrical fields, fire ants may infest and destroy circuits or switching mechanisms, damaging equipment such as air conditioners, traffic signal boxes, power plant transformers, electric well pumps, and even computers. It is estimated that fire ant damage in the United States approaches \$1 billion per year, considerably more than the \$200 million annual damage caused by boll weevils, and not far behind the \$1.5 billion annual damage from termites.

THE IMPORTED FIRE ANT CHALLENGE AND FEDERAL ACTION

Part of the difficulty in controlling imported fire ants is their unrelenting capacity to colonize. Although imported fire ants proliferate through their natural mating process, they spread most readily by “hitchhiking” on loads of agricultural goods transported by trucks. In the 1950s, the United States Department of Agriculture established the Federal Fire Ant Quarantine and still regulates the transportation of materials prone to infestation. Soil, nursery stock, sod, hay, straw, and ornamental plants require certification that these items have been inspected or treated and are free of fire ants before they can be moved. The

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What Texas cities spend to fight imported fire ants:

Treatment costs	\$ 301,552,049
Repair costs	\$ 80,626,562
Replacement costs	\$ 152,079,788
Medical costs	\$ 47,165,893
Total	\$ 581,424,292

What Texas agriculture spends to fight imported fire ants:

Crop yield losses	\$33,441,777
Livestock losses	\$4,627,030
Repair costs	\$16,956,961
Replacement costs	\$7,390,836
Farmstead costs	\$9,056,496
Medical costs	\$561,356
Veterinary costs	\$860,856
Control costs	\$16,019,737
Equipment costs	\$1,656,983
Total	\$90,572,032

program is administered through state regulatory agencies, such as agricultural departments, and inspectors check non-quarantined counties, sometimes treating minor infestations. In addition, Congress has passed laws such as the National Invasive Species Act addressing the invasive species crisis, and efforts are being made at the federal level to coordinate federal agencies' pest management programs.

ECONOMIC IMPACT IN TEXAS

Imported fire ants impact the Texas economy considerably, and in 1997 the Texas Legislature funded a program to investigate and develop solutions to the growing problem. The Texas Imported Fire Ant Research and Management Plan receives \$2.5 million each year to fund approximately 35 projects. Recent studies show that in 1998-1999, the cities of Austin, Dallas, Fort Worth, Houston, and San Antonio incurred fire ant costs and damages of more than \$580 million. Texas agriculture incurred costs and damages exceeding \$90 million for the year 1999-2000.

BENEFITS OF IMPORTED FIRE ANTS

In fairness, it should be pointed out that imported fire ants can be useful, although researchers admit this is difficult to quantify. They feed on other insects, arguably reducing the necessity for pesticides, and saving money for large-scale agricultural producers. They consume boll weevils, fleahoppers, and sugarcane borers, and can suppress disease-bearing tick and fly populations. In cities, imported fire ants eat flea larvae, chinch bugs, cockroach eggs, and other pests.

PEST MANAGEMENT WITH CHEMICALS

Early attempts to completely eradicate imported fire ants with chemical insecticides were unsuccessful and may even have encouraged their spread since native ant species were also affected. Native ants are the best check on imported fire ant populations because they compete for food, thereby diminishing the energy sources of their non-native rivals. Native ants also prey upon newly mated fire ant queens when they encounter them. Consequently, integrated pest management (IPM), an approach that uses a combination of tactics, is widely recommended to control imported fire ants. In Texas, authorities advocate the "two-step" method of fighting these ants: broadcast of bait that will be picked up by worker ants and eventually given the queen; and treatment of mounds individually with chemical or nonchemical substances.

PEST MANAGEMENT WITH BIOLOGICAL CONTROLS

One much-discussed biological control is a Brazilian species-specific parasitic phorid fly that seeks out and lays eggs on imported fire ants. A maggot soon hatches and migrates to the ant's head, consumes its contents, pupates, and creates enzymes that dissolve the ant's connective tissue, causing its head to fall off. Relatively few imported fire ants are actually killed in this manner, but the presence of the phorid flies significantly disrupts their foraging and makes more food available to native ant species. Researchers in Texas and Florida are experimenting with breeding and releasing these flies into the wild. Other examples of biological controls are a fungus that grows inside adult ants eventually killing them, and a parasitic ant that attaches to the imported fire ant queen in order to divert food from worker ants to itself.

CONCLUSION

Research is being directed toward a better understanding of the chemical substances (pheromones) fire ants release to control reproduction, foraging, and communication, with an eye toward disrupting these processes. Experts have realized that total eradication is neither advisable nor feasible and IPM aims to keep imported fire ant populations below the levels at which they cause harm, without eliminating all ants from the ecosystem.

—by Mahan Farmaian, SRC

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All articles are available through the Texas A&M University Department of Entomology fire ant website: <http://fireant.tamu.edu/>.